

# **Limits On Undetected Planets in the Six Transiting Planets Kepler-11 System**

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## **Abstract**

The Kepler-11 has five inner planets ranging from  $\sim 2 - 1$  times as massive Earth in a tightly-packed configuration, with orbital periods between 10 and 47 days. A sixth planet, Kepler-11 g, with a period of 118 days, is also observed. The spacing between planets Kepler-11 f and Kepler-11 g is wide enough to allow room for a planet to orbit stably between them. We compare six and seven planet fits to measured transit timing variations (TTVs) of the six known planets. We find that in most cases an additional planet between Kepler-11 f and Kepler-11 g degrades rather than enhances the fit to the TTV data, and where the fit is improved, the improvement provides no significant evidence of a planet between Kepler-11 f and Kepler-11 g. This implies that any planet in this region must be low in mass. We also provide constraints on undiscovered planets orbiting exterior to Kepler-11 g. representations will be described.